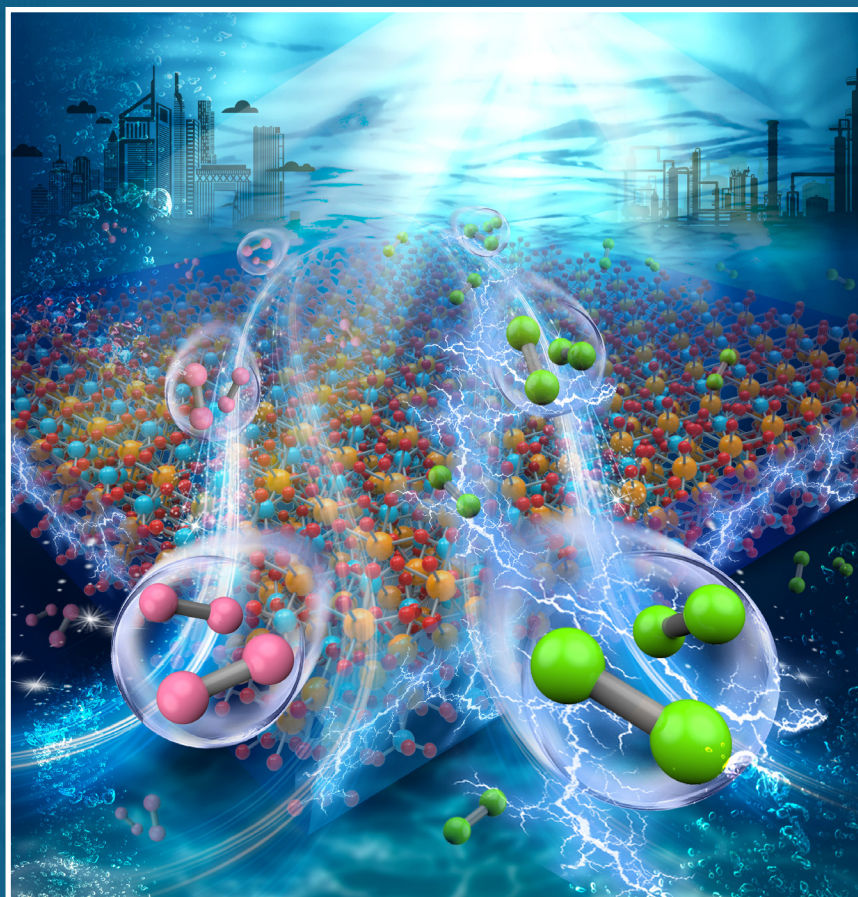




# 2024 CALENDAR

Featuring the 14<sup>th</sup> Annual  
CFN Image Contest





### **Photoelectrochemical Brine Splitting**

Transition metal layer can be controllably deposited on single crystalline bismuth vanadate as an effective photoanode for photoelectrochemical chlorine generation. The study provides insights into using artificial photosynthesis for byproducts that carry significant economic value while avoiding the energetically expensive oxygen evolution reactions.

(1st Place Winner: Scientific and Technical)

CFN capabilities used: CFN Material Synthesis & Characterization, Electron Microscopy, and Proximal Probes facilities

**Zhaoyi Xi, CFN PhD Student & User, Brookhaven National Lab & Stony Brook University**

**Selected Journal Cover by ACS Applied Materials & Interfaces**

Z. Xi, C. Zhou, K. Kisslinger, T. Nanayakkara, F. Lu, X. Tong, M. Liu\*.

ACS Appl. Mater. Interfaces, 15, 42, 49281–49288 (2023).

# January 2024

S	M	T	W	TH	F	S
24	25	26	27	28	29	30
31	1 New Year's Day Lab Closed	2	3	4	5	6
7	8	9	10	11	12	13
14	15 Martin Luther King Jr.'s Day Lab Closed	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31 CFN Proposal Deadline	1	2	3





**Stuck in the CFN Elevator k-Space**

I had the opportunity to stare at the CFN elevator walls for a while and noticed that the light reflections looked like a band structure map.

(1st Place Winner: My Life at the CFN)

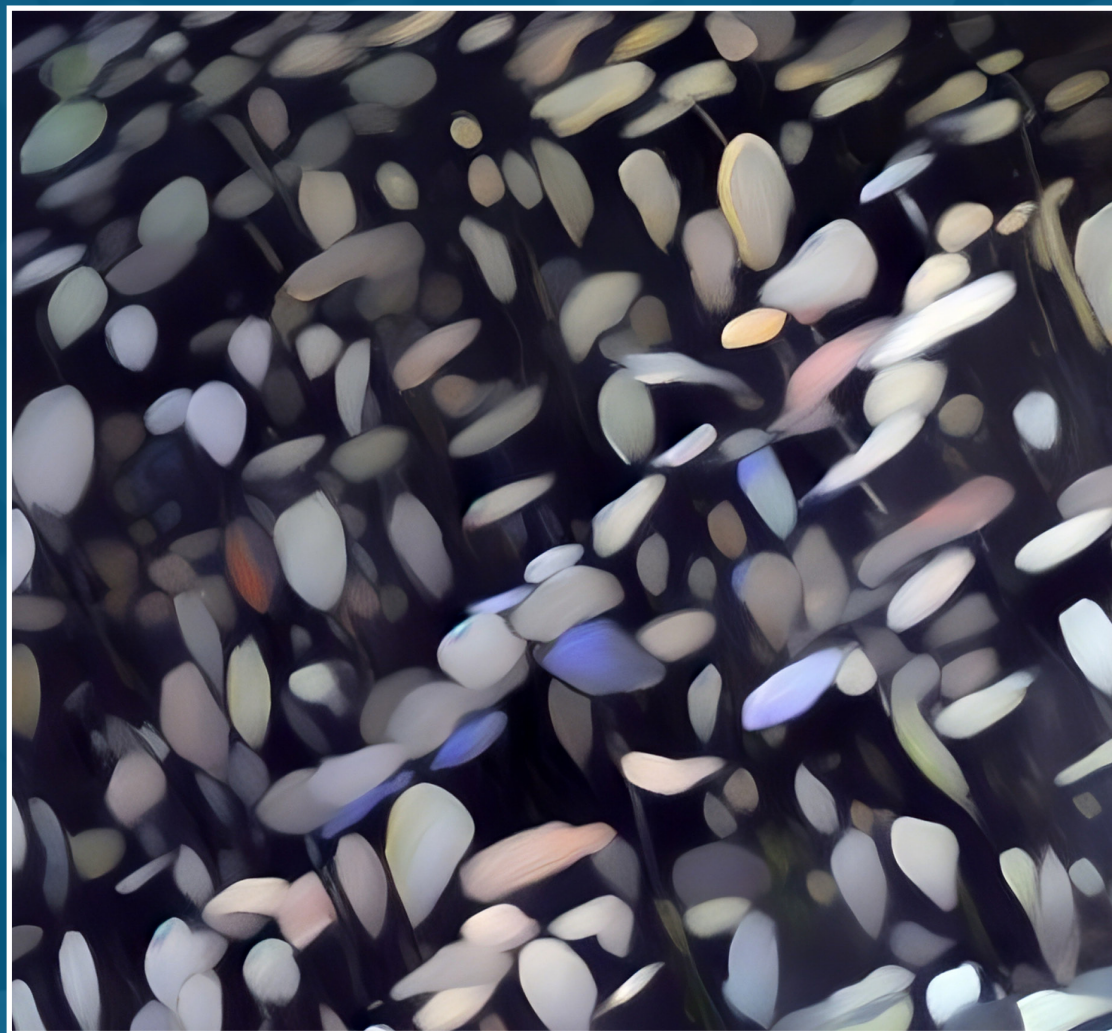
**Ashley Head, CFN Staff, Brookhaven National Laboratory**



# February 2024

S	M	T	W	TH	F	S
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19 President's Day Lab Closed	20	21	22	23	24
25	26	27	28	29	1	2
3	4	5	6	7	8	9





**Pt (100) surface after two cycles of CO adsorption-desorption**

CFN instrument used: The original image was obtained from the Electron Spectro-Microscopy at 21-ID beamline at NSLS-II. The image was processed by an AI mimicking the style of Oscar-Claude Monet.  
(2nd Place Winner: Scientific and Technical)

**Gengnan Li, CFN User, Argonne National Laboratory**



# March 2024

S	M	T	W	TH	F	S
25	26	27	28	29	<b>1</b>	<b>2</b>
<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	8 International Women's Day	<b>9</b>
<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	14 Pi Day	<b>15</b>	<b>16</b>
<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	22 Earth Day	<b>23</b>
<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
<b>31</b>	1	2	3	4	5	6





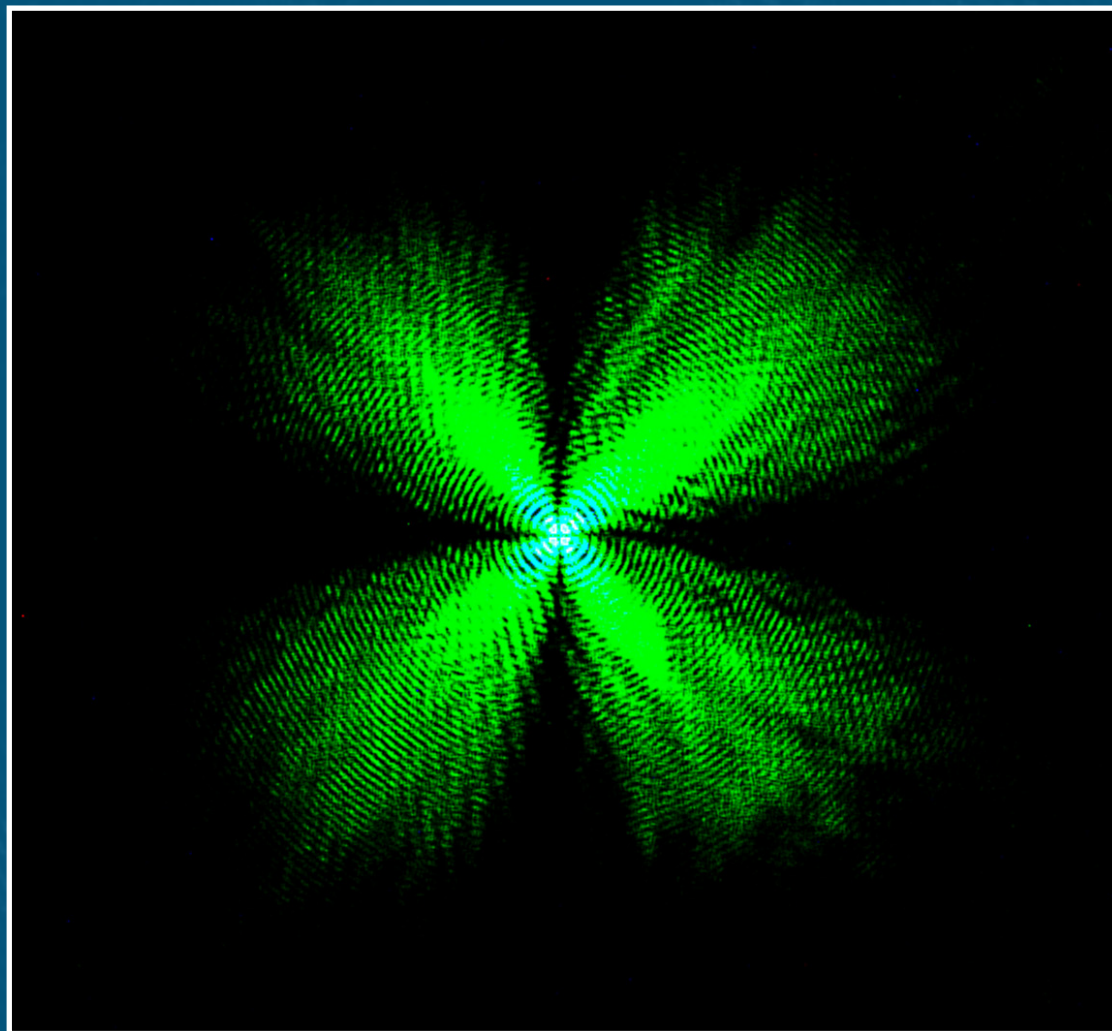
**Metal Organic Framework in a Hydrogen plasma during an in-situ ambient pressure XPS measurement**  
CFN instrument used: Ambient Pressure XPS (AP-XPS)

**Anibal Boscoboinik, CFN Staff, Brookhaven National Laboratory**

# April 2024

S	M	T	W	TH	F	S
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4
5	6	7	8	9	10	11





### **Laser flower**

Diffraction of a linearly polarized laser focused through an oil immersion objective lens.  
CFN instrument used: Olympus IX81 confocal microscope

**Shreetu Shrestha, CFN Postdoc, Brookhaven National Laboratory**

# May 2024

S	M	T	W	TH	F	S
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13 NSLS-II and CFN Users' Meeting	14 NSLS-II and CFN Users' Meeting	15 NSLS-II and CFN Users' Meeting	16 NSLS-II and CFN Users' Meeting <hr/> DOE Review	17 NSLS-II and CFN Users' Meeting <hr/> DOE Review	18
19	20	21	22	23	24	25
26	27 Memorial Day Lab Closed	28	29	30	31 CFN Proposal Deadline	1
2	3	4	5	6	7	8





Ripening raspberries and the forest after a rain shower

Gwen Wright, CFN Staff, Brookhaven National Laboratory

# June 2024

S	M	T	W	TH	F	S
26	27	28	29	30	31	<b>1</b>
<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>
<b>16</b>	<b>17</b>	<b>18</b>	19 Juneteenth Lab Closed	<b>20</b>	<b>21</b>	<b>22</b>
<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>
<b>30</b>	1	2	3	4	5	6





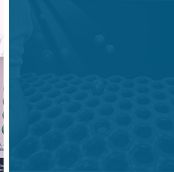
**CFN – A BBQ of Innovation where young scientists add special spice**  
 (2nd Place Winner: My Life at the CFN)

**Mueed Ahmad, CFN User, Stony Brook University**

**Trapping Noble Gases in Nanorings could help travel long**

Center for Functional Nanomaterials  
 Brookhaven National Laboratory

Brookhaven Lab researchers have discovered how tiny cages, made of only palladium, or billions of atoms, can trap argon, krypton, and xenon atoms at above-freezing temperatures and hard to trap using other methods because of their high boiling points. The researchers studied the cages using a combination of experimental methods called density functional theory (DFT) and X-ray photoelectron spectroscopy (XPS).



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ENERGY



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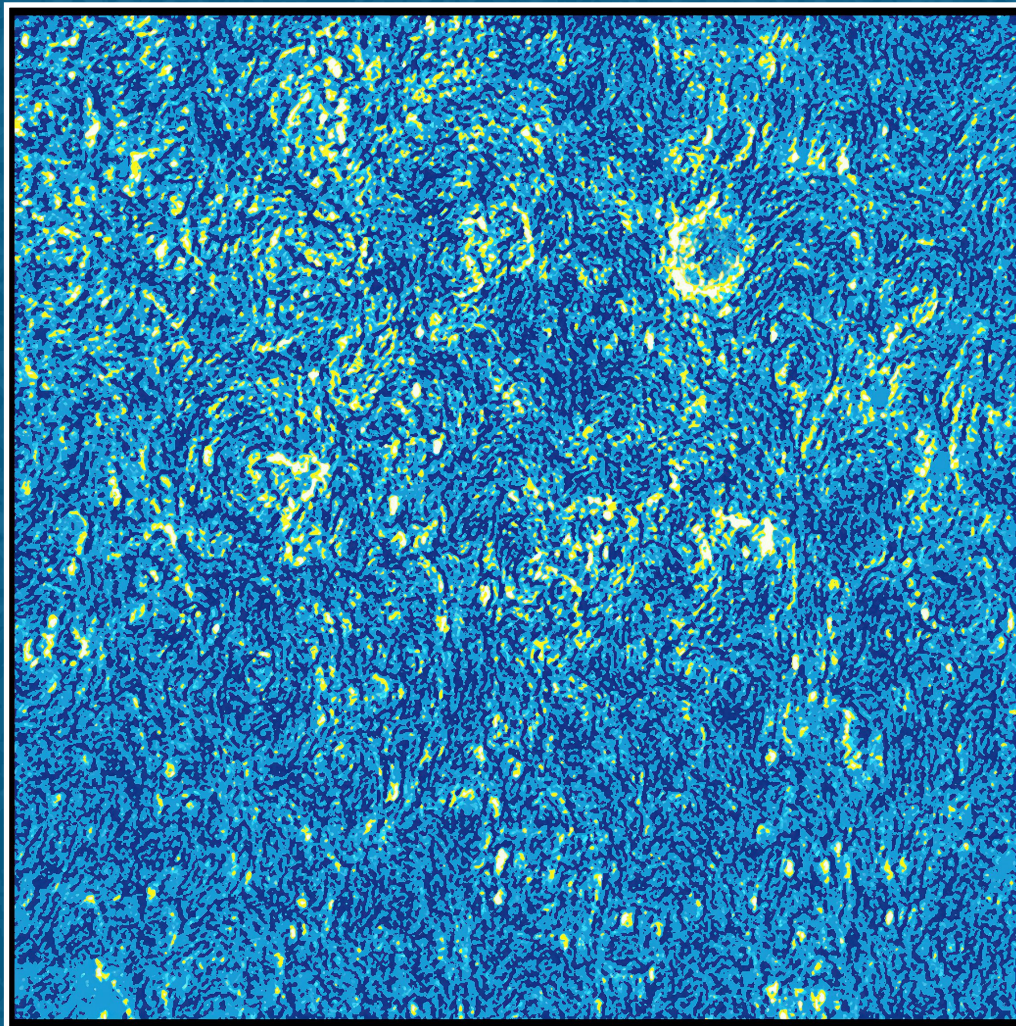
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# July 2024

S	M	T	W	TH	F	S
30	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b> Independence Day Lab Closed	<b>5</b>	<b>6</b>
<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>
<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>





**Cu (110) in the eyes of Vincent van Gogh the surface scientist**

A LEEM image of the surface of a Cu (110) single crystal consisting of densely packed terraces separated by surface steps. Surface steps result in a dark contrast in a LEEM image and are rendered in a darker shade of blue in the image. (30  $\mu\text{m}$  X 30  $\mu\text{m}$ ).

CFN instrument used: XPEEM/LEEM end station at NSLS-II (21-ID)

**Shyam Patel, CFN User, Binghamton University**



# August 2024

S	M	T	W	TH	F	S
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7





Burning wood into nano shapes, at the rhythm of the guitar, with CFN friends.

Anibal Boscoboinik, CFN Staff, Brookhaven National Laboratory



# September 2024

S	M	T	W	TH	F	S
<b>1</b>	<b>2</b> Labor Day Lab Closed	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>
<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>
<b>29</b>	<b>30</b> CFN Proposal Deadline	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>



### **Xenon Plasma**

The sample — silica nanocages deposited on ruthenium metal powder — was exposed to xenon plasma during a noble gas trapping experiment. The image was taken from the load-lock chamber window of the instrument at the time of xenon plasma exposure.

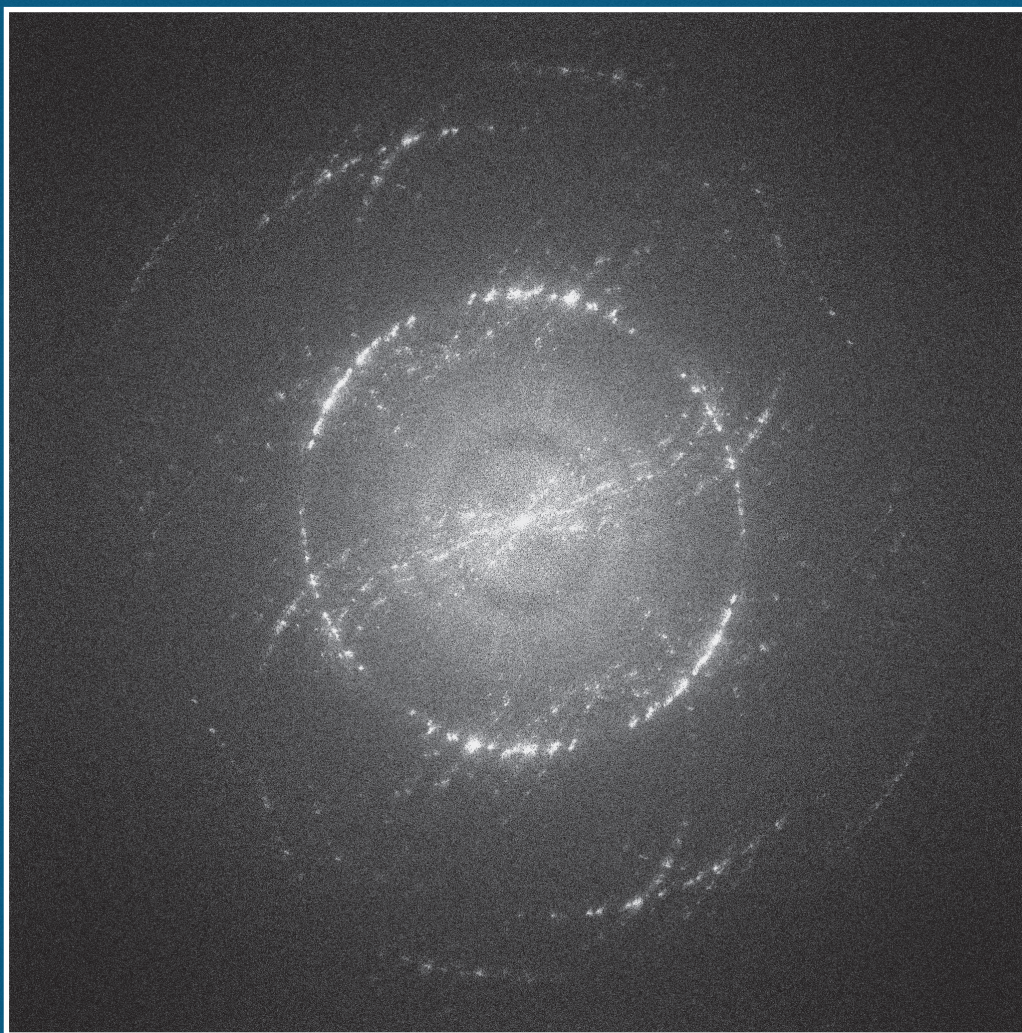
CFN instrument used: The equipment used was Reactor STM, it is a dedicated experimental setup for studying chemical processes on electrically conductive surfaces by means of scanning tunneling microscopy and related surface preparation and analysis techniques under UHV conditions and under controlled flow of reactive gasses.

**Laiba Bilal (Zenvae Pillay), CFN User, ECE- Stony Brook University**

# October 2024

S	M	T	W	TH	F	S
29	30	1	2	3	4	5
6	9 National Nano Day	8	9	10	11	12
13	14 Indigenous Peoples' Day	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9





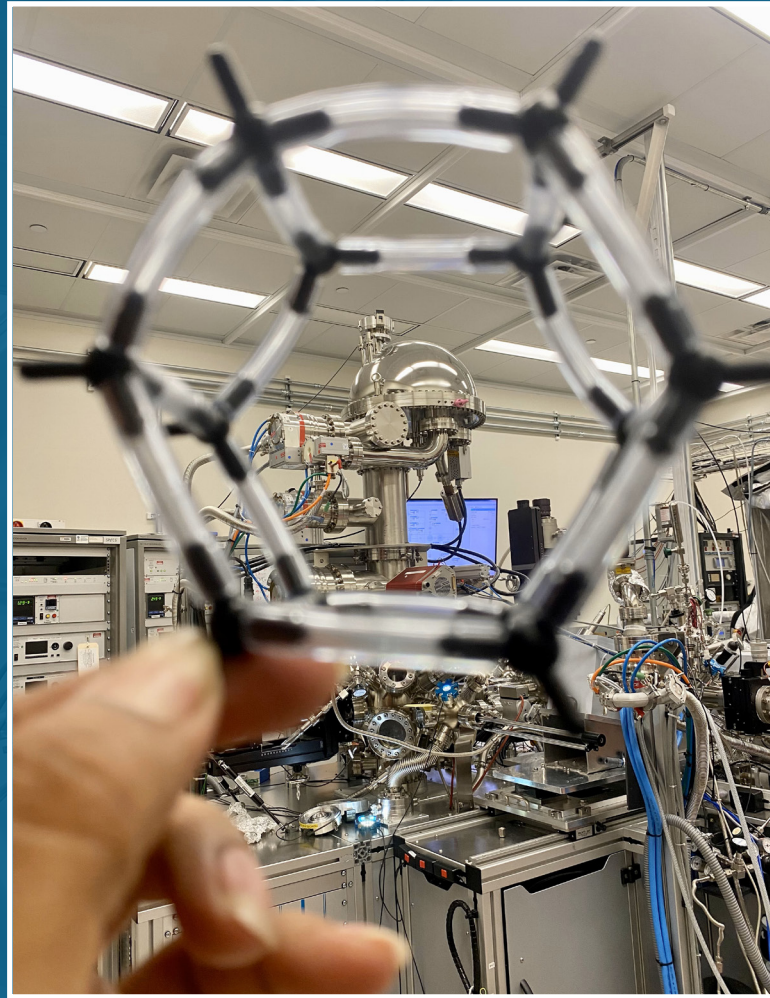
**A unique FFT of polymerized nanocomposites made of silver and graphene quantum dots**  
The strange pattern shows many rings when usually one is observed, inviting the observer to find its cause.  
CFN instrument used: CFN's FEI Talos F200X

**Nataniel Medina Berríos, CFN User, University of Puerto Rico - Rio Piedras Campus**



# November 2024

S	M	T	W	TH	F	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11 Veteran's Day Lab Closed	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28 Thanksgiving Day Lab Closed	29 Day After Thanksgiving Lab Closed	30
1	2	3	4	5	6	7



### **Trapping in Cages**

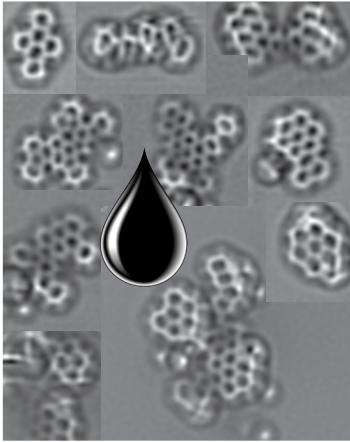
Depiction of a nanocage structure used for trapping noble gas. The instrument in the background is the Ambient Pressure XPS used for the characterization of samples during the experimental work. My research is mainly focused on trapping noble gases in silica nanocages and so my life at CFN revolves around the cages.

**Laiba Bilal (Zenvee Pillay), CFN User, ECE- Stony Brook University**



# December 2024

S	M	T	W	TH	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24 Christmas Eve Lab Closed	25 Christmas Day Lab Closed	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

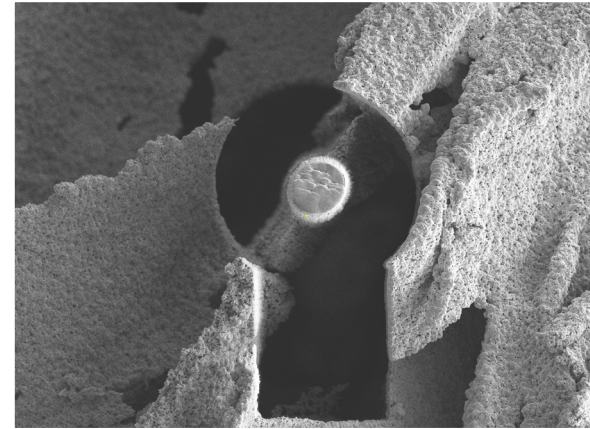


### Analyzing solid fossil-fuel pitches by High-Resolution Atomic Force Microscopy

A glimpse of nature's near-infinite number of molecules no one ever has seen in detail before. Imaging at the edge of the ultimate possible dimensions in real space before physics defies picturing more detail as of entering quantum or sub-atomic scale.

CFN instrument used: Low Temp STM/AFM (HR-AFM).

Percy Zahl, CFN Staff, Brookhaven National Laboratory



### Unlock the secrets of the nanoworld

CFN instrument used: Helios G5 Dual Beam SEM/FIB Microscope  
Cheng-Chu Chung, CFN User, Stony Brook University



### The ebeam evaporator comes home to the clean room

CFN instrument used: ebeam evaporator

Gwen Wright, CFN Staff, Brookhaven National Laboratory



### **The Magic CFN Garden**

It's all flowers and smiles at the ISC group meeting.  
Dario Stacchiola, CFN Staff, Brookhaven National Laboratory



### **Standing on the shoulders of giants**

Chenyu Zhou, CFN Staff, Brookhaven National Laboratory



### **Pie is the answer!**

James Buddenhagen is the pie man! When the cart rolls, he creates smiles :)  
Pam Ciufu, CFN Staff, Brookhaven National Laborator





U.S. DEPARTMENT OF  
**ENERGY**

The Center for Functional Nanomaterials (CFN) is a DOE Office  
of Science User Facility at Brookhaven National Laboratory



**Brookhaven**  
National Laboratory